The Builder.

No. CCCXCVI.

SATURDAY, SEPTEMBER 7, 1850.

THE area in Hyde-park for the proposed International Exhibition of 1851, is wholly enclosed by a hoarding, so constructed as not to injure by a nail the boards that compose it, and which are probably to form the floor of the intended structure: there are no castings yet on the ground, but temporary offices and sheds have been erected, and everything seems ready for a fair start when the materials arrive. The hoarding, we may mention by the way, is formed thus:—two-battens, about an inch and a half apart, are fixed upright in the ground at regular distances: between these, 1½-inch deals are laid edge upon edge, the ends being clipped by the battens; and the top of the latter being fastened together by a piece of iron hooping, the whole is made firm and secure.

We have now the pleasure to lay before our readers a perspective view of the building as it will appear seen from the south-west, a ground-plan of the structure, showing its general divisions, with position of the proposed gallery (shaded dark), and a geometrical elevation of the transept.*

Our readers may compare them with the illustrations we published of the design originally issued by the Building Committee.† The plan is a parallelogram, 1848 feet long and 408 feet wide, with an addition on the north side, 936 feet long and 48 feet wide. The height is 66 feet. Nearly midway, 900 feet to the centre, on west side, and 948 feet on the east, a transept is formed, with a semi-circular roof, 108 feet high from the ground, to enclose a group of trees. This further serves to break the long line of the side elevation, and marks out the central entrance. There is another principal entrance at each end. The main parallelogram is formed into 11 divisions longitudinally, alternately 24 feet and 48 feet wide, with the exception of the great central walk, which is 72 feet broad. There are three large refreshment courts. The area on the ground-floor is 752,832 square feet: the area of the galleries included in the contract, and the position of which is marked on the plan by a dark tint, is 102,528 square feet, making a total of 855,360 feet. Other galleries may be introduced if needed, at an extra cost, affording an additional available area of 90,432 square feet.‡

As materials for consideration, we may here mention that the space demanded by the metropolitan districts, up to August 1st, is 27,774 square feet of floor or table, and 24,243 square feet of wall space. For Manchester, it is said, 10,000 square feet have been guaranteed. America has accepted 80,000 square feet.

On either side of the central entrance are the pay-places, rooms for the Royal Commissioners, the committee, clerks, &c. At the east and west entrances are pay-places and clerks' rooms.

The construction is of iron and glass: but externally, for enclosure, some wood is used. The iron columns are placed 24 feet apart, and in each space between these, externally, are two wooden columns of the same size. Of cast-iron girders, we are told, there are 2,244 for supporting galleries and roofs; 1,128 intermediate bearers; 358 wrought-iron trusses for supporting roof; 3,230 columns; 34 miles of gutters for carrying water to the columns, which are hollow, and serve as water pipes; 202 miles of sash bars, (?) and 900,000 superficial feet of glass.* Some of these particulars differ from those given by Mr. Paxton in his remarks at Bakewell (see p. 403, *ante*), but are, we believe, correct.

The spaces between the columns next the ground, and elsewhere, are fitted with moveable louvre-plates, of iron, for ventilation.

The roof, also of glass and iron, consists of a series of ridges and valleys, 8 feet span, running transversely, so that there is a valley at

the head of each column. As we have elsewhere mentioned, Mr. Paxton contemplates covering the greater part of the building with canvas, to be watered in hot weather.

We do not see where the steam-engine is to be placed: vibration must, of course, be guarded against.

The amount of the contract by Messrs. Fox and Henderson for the use and waste of the materials employed in the building, is 79,800*l.*, the whole building to become the property of the contractors, and to be removed by them. If, on the contrary, the building be permanently retained, the cost of it will be 150,000*l.*†

With reference to some flourishes that are being indulged in as to the execution of the work, and the arrangement that the whole building is to be covered in by January 1st, we would say that when the structure is finished and the promise kept it will be quite early enough to glorify the speed and praise the execution. The powerful family influence which was exerted in favour of the present design, the great injustice done by its acceptance to the architects and engineers who gave their time and thought to the work in reply to the commissioners' invitation, and the way in which the arrangement was entered into with the contractors for the execution of it without competition, lead us to view the rising structure with less confidence and less pleasant feelings than we should otherwise have gladly hastened to express.

A FEW GROPINGS IN PRACTICAL ACOUSTICS.‡

As there is much not only in the building, but in the auditory, to influence hearing, so is there also much in the speakers themselves: as the conformation of the ear may be more or less favourable for the reception of sound, so that of the mouth probably is favourable or otherwise for giving it distinct utterance, according as it may throw the voice in a mass against the readiest reverberating surfaces, or allow it at once to scatter, and so lose much of its propulsive effect. Those who possess the mysterious gift of volubility are not always favoured with the clearest enunciation; and there are many who show themselves satisfied with the bare fact of speaking, and have no care for the comfort of those who have to listen: such persons would cause detraction to any building as regards its sounding properties.

We use the term *reflection* of sound; but that, we apprehend, is a phenomenon which is very rare, since it is the sound of the substance impinged upon which is awakened, and not simply a reverberation or echo of the sound whose pulsations excited it: were this not the case such propagation of sound might be less objectionable; but the tone and quality of the original sound being liable to infelicitous accompaniments, its prevention becomes a desideratum. It will be found that every apartment has its key-note to which a speaker must pitch his voice aright ere he can speak or be heard with comfort; and, as in musical instruments, so, we should suppose, in buildings, they must be attuned by use before their acoustic properties can be established. The wave-like vibrations of the air, produced by sound, are in number and velocity according to the pitch of the tone, those from low notes being slower and fewer than those from high ones; consequently the sound in the former is not carried so far; to be heard properly, therefore, it is necessary that *force* be combined with *pitch* in the voice in order to adapt it to a large apartment; and hence it may be found that some who have become accustomed to speak in an apartment of a given size cannot all at once adjust their voice to, or discover the pitch of, one that is of larger dimensions.

In church-building, we have known the sloping sides of a high-pitched, open-timbered roof prove very favourable to hearing; yet this roof was open to the ridge, and the space overhead was consequently great: had the sound proved deficient, a ceiling laid upon the collar-beams, about two-thirds up, would have been advisable. In the same church, the galleries projected some three feet from the beams which carried them, and a portion of the soffite was sloped parallel with the roof: this slope was also considered advantageous to the hearing. What conduced farther to success, was the circumstance that in a shallow, arched recess (or chancel) behind the pulpit, the back, instead of being at right angles with the axal line of the church, formed at the centre a very obtuse re-entrant angle, having thus two slopes affording very favourable surfaces for returning the backward rays of sound. Thus much for form. The wall-plastering was immediately on the masonry, without battens and lathing; consequently there was no absorption or passage of sound there: the proportion which the plain walls bore to the windows was also considerable, these being narrow and few; so that the loss by these was reduced to a minimum.

The sounding-board over a pulpit or rostrum serves at once to prevent loss of sound through excessive height of ceiling, and to direct it towards the auditory: it has been employed with great success, in form of the quarter of an oblong spheroid, placed so that the situation of the speaker's mouth corresponded nearly to the focus: with the concavity arching upwards, the open end in front, and the axis elevated forwards, the necessary effect was that the rays which impinged on it were scattered forth, and prevented being dissipated either above or behind: a similar portion of a paraboloid is equally suitable: a niche, segmental in plan, and semicircular-headed, struck from the position of the speaker, would be likely to afford a useful result. In the old stone-canopied seats on Westminster Bridge, the slightest whisper in one could be heard in that opposite it: from recollection, these did not form opposite ends of a long ellipse; but they might have done so with additional effect—the foci in the line of the inner side of the parapets.

The Isacoustic-curve, or curve of equal-hearing, of Mr. Jno. Scott Russell, presents an ingenious sectional arrangement for the sittings of theatres, &c., by which the speaker sees the faces of all his auditors,—they being therefore favourably circumstanced for hearing. We have seen a horisontal figure of equal-hearing,—being an egg-shaped diagram, showing the relative distances at which a speaker could be heard with equal distinctness,—in front—at either side—and in rear,—he being supposed to be speaking straight-forward: we think the distances were 70, 35, and 25 feet, but cannot recall it with certainty: it can, of course, be easily determined by experiment.

* See pp. 426 & 427.
† See pp. 277-8 288, *ante*.
‡ The [illegible] are computed to centre of columns.

* Messrs. Chance, of Birmingham, are, we believe, to supply the glass.
† The Athenæum says—"As already explained, the exhibiting surface will occupy a space of about 21 acres. The total cubic contents of the building will be 33,000,000 feet. The total amount of contract for use, waste, and maintenance is 79,800*l.*,—or very little more than nine-sixteenths of a penny per foot cube. The total value of the building, were it to be permanently retained, would be 150,000*l.* or rather less than one penny and one-twelfth of a penny per foot cube."
‡ See page 411 *ante*.

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